We Claim:

1. A semiconductor structure comprising:

a monocrystalline silicon substrate;

an amorphous oxide material overlying the monocrystalline silicon substrate;

a monocrystalline perovskite oxide material overlying the amorphous oxide material;

a monocrystalline compound semiconductor material overlying the monocrystalline perovskite oxide material;

an antenna, the antenna being operable to transmit an electromagnetic energy transmission;

a source component overlying the monocrystalline compound semiconductor material, the source component being operable to generate the electromagnetic energy transmission;

an interconnect coupled between the antenna and the source component, the interconnect being operable to guide the electromagnetic energy transmission from the source component to the antenna; and

a receiver component overlying the monocrystalline compound semiconductor material, the receiver component being operable to generate a detection signal in response to receipt at the antenna of a reflection of the electromagnetic energy transmission off of the object;

wherein the interconnect is operable to guide a portion of the electromagnetic energy transmission from the source component to the receiver component, the portion being operable as a reference signal.

2. The semiconductor structure of claim 1, wherein the source component is one of a radio frequency (RF) transmitter and an optical source component.

3. The semiconductor structure of claim 1, wherein the optical source component is one of a vertical cavity surface emitting laser (VCSEL), a group III-V compound semiconductor laser, and a light emitting diode (LED).

4. The semiconductor structure of claim 3, wherein the group III-V compound semiconductor laser is one of a gallium arsenide (GaAs) laser, an aluminum gallium arsenide (AlGaAs) laser, a gallium nitride (GaN) laser, an indium phosphide (InP) laser, and an indium gallium arsenide (InGasAs) laser.

5. The semiconductor structure of claim 1, wherein the receiver component is one of a radio frequency (RF) receiver and an optical detector component.

6. The semiconductor structure of claim 5, wherein the optical detector component is one of a photodetector and a photoelectric detector.

7. The semiconductor structure of claim 6, wherein the photodetector is one of a photodiode and a phototransistor.

8. The semiconductor structure of claim 7, wherein the photoelectric detector is a group III-V compound semiconductor detector.

9. The semiconductor structure of claim 8, wherein the group III-V compound semiconductor detector is one of a gallium arsenide (GaAs) detector, an aluminum gallium arsenide (AlGaAs) detector, a gallium nitride (GaN) detector, an indium phosphide (InP) detector, and an indium gallium arsenide (InGaAs) detector.

10. The semiconductor structure of claim 1, wherein the interconnect is one of an optical waveguide and a metallic waveguide.

11. The semiconductor structure of claim 10, wherein the optical waveguide is formed from one of an organic material, an inorganic material, and a gas medium.

12. The semiconductor structure of claim 11, wherein the organic material is one of an epoxy, a polycarbonate, a polystyrene, a polymethyl methacrylate, a polysulfone, a polyimide, and a polyurethane material.

13. The semiconductor structure of claim 11, wherein the organic material is one of a glass and a ceramic material.

14. The semiconductor structure of claim 13, wherein the ceramic material is one of a silica, a lithium niobate, a lead lanthamum, a zirconate titanate and a barium titanate (BTO) material.

15. The semiconductor structure of claim 1, wherein the interconnect is a first interconnect, and wherein the semiconductor structure further comprises a second interconnect, the second interconnect being operable to guide the reflection of the electromagnetic energy transmission off of the object from the antenna to the receiver component.

16. The semiconductor structure of claim 1, wherein the interconnect comprises a reflective component, the reflective component being operable to guide the electromagnetic energy transmission.

17. The semiconductor structure of claim 1, wherein the antenna is a horn antenna.

18. The semiconductor structure of claim 1 further comprising a processor overlying the monocrystalline compound semiconductor material, the processor is operable to determine a parameter associated with the object based on the reference signal and the detection signal, wherein the parameter is one a direction, a distance, a height, and a speed.

19. The semiconductor structure of claim 1, wherein the electromagnetic energy transmission is an electromagnetic energy transmission in one of the radio, microwave, infrared, visible light and ultraviolet spectrums.

20. A process for fabricating a semiconductor structure for detecting an object comprising:

providing a monocrystalline silicon substrate;

depositing a monocrystalline perovskite oxide film overlying the monocrystalline silicon substrate, the film having a thickness less than a thickness of the material that would result in strain-induced defects;

forming an amorphous oxide interface layer containing at least silicon and oxygen at an interface between the monocrystalline perovskite oxide film and the monocrystalline silicon substrate;

epitaxially forming a monocrystalline compound semiconductor layer overlying the monocrystalline perovskite oxide film;

forming a source component overlying the monocrystalline compound semiconductor layer, the source component being operable to generate an electromagnetic energy transmission;

providing an antenna, the antenna being operable to transmit the electromagnetic energy transmission;

forming an interconnect coupled between the antenna and the source component, the interconnect being operable to guide the electromagnetic energy transmission from the source component; and

forming a receiver component overlying the monocrystalline compound semiconductor layer, the receiver component being operable to generate a detection signal in response to receipt at the antenna of a reflection of the electromagnetic energy transmission off of an object;

wherein the interconnect is operable to guide a portion of the electromagnetic energy transmission from the source component to the receiver component, the portion being operable as a reference signal.

21. The process of claim 20, the step of forming an source component comprising forming one of a radio frequency (RF) transmitter and an optical source component overlying the monocrystalline semiconductor layer.

22. The process of claim 21, the step of forming an optical source component comprising forming one of a vertical cavity surface emitting laser (VCSEL), a group III-V compound semiconductor laser, and a light emitting diode (LED) overlying the monocrystalline compound semiconductor layer.

23. The process of claim 22, wherein the group III-V compound semiconductor laser is one of a gallium arsenide (GaAs) laser, an aluminum gallium arsenide (AlGaAs) laser, a gallium nitride (GaN) laser, an indium phosphide (InP) laser, and an indium gallium arsenide (InGasAs) laser overlying the monocrystalline compound semiconductor layer.

24. The process of claim 20, the step of forming a receiver component comprising forming one of a radio frequency (RF) receiver and an optical detector component overlying the monocrystalline compound semiconductor layer.

25. The process of claim 24, the step of forming an optical detector component comprising forming one of a photodetector and a photoelectric detector overlying on the monocrystalline compound semiconductor layer.

26. The process of claim 25, the step of forming a photodetector comprising forming one of a photodiode and a phototransistor overlying on the monocrystalline compound semiconductor layer.

27. The process of claim 25, the step of forming a photoelectric detector comprising forming a group III-V compound semiconductor detector overlying on the monocrystalline compound semiconductor layer.

28. The process of claim 27, the step of forming a photoelectric detector comprising forming one of a gallium arsenide (GaAs) detector, an aluminum gallium arsenide (AlGaAs) detector, a gallium nitride (GaN) detector, an indium phosphide (InP) detector, and an indium gallium arsenide (InGaAs) detector overlying the monocrystalline compound semiconductor layer.

29. The process of claim 20, the step of forming an interconnect comprising forming one of an optical waveguide and a metallic waveguide coupled between the antenna and the source component.

30. The process of claim 29, the step of forming an optical waveguide comprising forming an optical waveguide from one of an organic material, an inorganic material, and a gas medium.

31. The process of claim 30, the step of forming an optical waveguide from an organic material comprising forming an optical waveguide from one of an epoxy, a polycarbonate, a polystyrene, a polymethyl methacrylate, a polysulfone, a polyimide, and a polyurethane material.

32. The process of claim 30, step of forming an optical waveguide from an inorganic material comprising forming an optical waveguide from one of a glass and a ceramic material.

33. The process of claim 32, the step of forming an optical waveguide from a ceramic material comprising forming an optical waveguide from one of a silica, a lithium niobate, a lead lanthamum, a zirconate titanate and a barium titanate (BTO) material.

34. The process of claim 20, wherein the interconnect is a first interconnect, and wherein the process further comprises forming a second interconnect coupled with the first interconnect, the second interconnect being operable to guide the reflection of the electromagnetic energy transmission off of the object from the antenna to the receiver component.

35. The process of claim 20, the step of forming an interconnect comprising forming an interconnect having a reflective component, the reflective component being operable to guide the electromagnetic energy transmission.

36. The process of claim 20, the step of forming an antenna comprising forming a horn antenna.

37. The process of claim 20 further comprising forming a processor to overlie the monocrystalline compound semiconductor layer, the processor being operable to determine a parameter associated with the object based on the reference signal and the detection signal, wherein the parameter is one of a direction, a distance, a height, and a speed.

38. The process of claim 20, wherein the electromagnetic energy transmission is an electromagnetic energy transmission in one of the radio, microwave, infrared, visible light and ultraviolet spectrums.

39. A method for detecting an object comprising:

providing a monocrystalline silicon substrate;

depositing a monocrystalline perovskite oxide film overlying the monocrystalline silicon substrate, the film having a thickness less than a thickness of the material that would result in strain-induced defects;

forming an amorphous oxide interface layer containing at least silicon and oxygen at an interface between the monocrystalline perovskite oxide film and the monocrystalline silicon substrate;

epitaxially forming a monocrystalline compound semiconductor layer overlying the monocrystalline perovskite oxide film;

transmitting an electromagnetic energy signal using active devices formed in the monocrystalline compound semiconductor layer; and

generating a detection signal in response to receipt of a reflection of the electromagnetic energy signal off of an object,

wherein a portion of the electromagnetic energy signal is operable as a reference signal.

40. The method of claim 39 further comprising determining a parameter associated with the object based on the reference signal and the detection signal, wherein the parameter is one of a direction, a distance, a height and a speed.